Thesis B.Sc.

Thesis M.Sc.

IDP

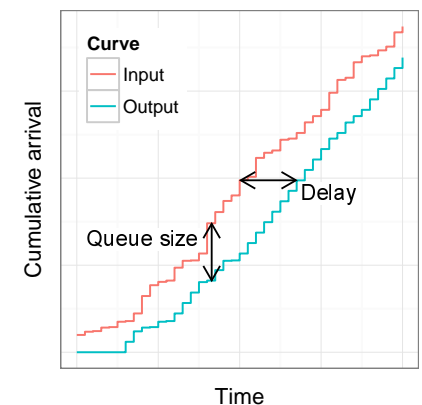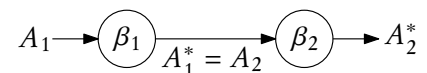# Automatic Latency Guarantees using Network Calculus

Motivation

Many real world networking scenarios require performance guarantees, such as a maximum latency between a number of network nodes. We want to have an automatic process to calculate and verify such guarantees for arbitrary topologies.

Mininet is a tool to emulate network topologies and traffic flows on a single Linux machine [1]. It allows to setup complex topologies for experiments in a fast and automated way.

Network Calculus is a theoretical framework for providing performance guarantees in computer networks, such as upper delay bounds per flow and buffer backlog bounds per network node. Several tools implement Network Calculus, for example DiscoDNC [2].

Your task will be to implement a pipeline which contains the setup of topologies in Mininet, the automatic application of an existing Network Calculus tool to those topologies, the verification of the results of the tool with measurements in Mininet, and the visualization of the results.

$$A_1 \longrightarrow \boxed{\beta_1} \xrightarrow{A_1^* = A_2} \boxed{\beta_2} \longrightarrow A_2^*$$

[1] http://mininet.org, [2] https://github.com/NetCal/DNC

Your Task

- Familiarize with DiscoDNC and Mininet
- Integrate DiscoDNC into Mininet
- Automate verification of DiscoDNC results using Mininet measurements
- Automate visualization of results

Topic can be extended to fit a Masters Thesis or IDP.

Requirements

- Knowledge working with Linux/Mininet
- Advantageous to have a rough understanding of Network Calculus

Contact

Dominik Scholz   scholz@net.in.tum.de
Max Helm   helm@net.in.tum.de
Benedikt Jaeger   jaeger@net.in.tum.de
Henning Stubbe   stubbe@net.in.tum.de